

THE INVENTION CLAIMED IS:

1. An apparatus comprising:

a tank adapted to contain fluid;

at least one support component mounted in the tank

5 and adapted to support a substrate in a supported position  
at least partially submerged in the fluid;

a transducer adapted to output sonic energy into  
the fluid; and

a reflector positioned at a side of the substrate

10 and adapted to reflect the sonic energy toward an edge of  
the substrate so as to provide a 100% duty cycle;

wherein the reflector is positioned such that the  
reflector does not obstruct a path employed to load the  
substrate into the supported position and to unload the  
15 substrate from the supported position.

2. The apparatus of claim 1 wherein the  
reflector is entirely to the side of the substrate.

20 3. The apparatus of claim 1 wherein the  
reflector is curved so as to focus the reflected sonic  
energy at the edge of the substrate.

4. The apparatus of claim 1 wherein the  
25 reflector reflects the sonic energy at an angle that  
corresponds to an angle of an edge bevel of the substrate.

5. An apparatus comprising;

a tank adapted to contain fluid;

30 a plurality of rollers mounted in the tank and  
including at least one driven roller and adapted to support  
a substrate in a supported position at least partially  
submerged in the fluid while rotating the substrate;

a transducer adapted to output sonic energy into  
35 the fluid;

a first reflector mounted on a first wall of the tank and facing a first side of the substrate and adapted to reflect the sonic energy toward an edge of the substrate; and

5 a second reflector mounted on a second wall of the tank and facing a second side of the substrate and adapted to reflect the sonic energy toward the edge of the substrate;

wherein:

10 the first and second reflectors are adapted to provide a 100% duty cycle; and

the first and second reflectors are positioned such that the first and second reflectors do not obstruct a path employed to load the substrate into the supported 15 position and to unload the substrate from the supported position.

6. The apparatus of claim 5 wherein the reflectors reflect the sonic energy at angles that correspond to angles of an edge bevel of the substrate.

7. The apparatus of claim 5 wherein the reflectors are curved so as to focus the reflected sonic energy at the edge of the substrate.

25 8. The apparatus of claim 5 wherein the transducer is positioned below the rollers.

9. A method for cleaning a substrate comprising:  
30 providing an apparatus that includes:

a tank containing fluid;  
at least one support component mounted in the tank and adapted to support a substrate in a supported position at least partially submerged in the 35 fluid;

a transducer adapted to output sonic energy into the fluid; and

5 a reflector positioned at a side of the substrate and adapted to reflect the sonic energy toward an edge of the substrate;

loading the substrate into the tank without moving the reflector;

supporting the substrate in the tank, wherein the substrate is at least partially submerged in the fluid;

10 outputting sonic energy through the fluid; and

reflecting the sonic energy off of the reflector toward an edge of the substrate.

15 10. The method of claim 9 further comprising unloading the substrate from the tank without moving the reflector.

20 11. The method of claim 9 wherein reflecting the sonic energy toward an edge of the substrate includes reflecting the sonic energy toward the edge of the substrate so as to provide a 100% duty cycle.

25 12. The method of claim 9 further comprising focusing the reflected sonic energy at the edge of the substrate.

30 13. The method of claim 9 wherein reflecting the sonic energy toward an edge of the substrate includes reflecting the sonic energy at an angle that corresponds to an angle of an edge bevel of the substrate.

35 14. A method for cleaning a substrate comprising: providing an apparatus that includes:

a tank containing fluid;

a plurality of rollers mounted in the tank and including at least one driven roller and adapted to support a substrate in a supported position at least partially submerged in the fluid while rotating the  
5 substrate;

a transducer adapted to output sonic energy into the fluid;

10 a first reflector mounted on a first wall of the tank and facing a first side of the substrate and adapted to reflect the sonic energy toward an edge of the substrate; and

15 a second reflector mounted on a second wall of the tank and facing a second side of the substrate and adapted to reflect the sonic energy toward the edge of the substrate;

loading the substrate into the tank without moving the first and second reflectors;

supporting the substrate in the tank, wherein the substrate is at least partially submerged in the fluid;

20 outputting sonic energy through the fluid;  
and

reflecting the sonic energy off of the first and second reflectors toward an edge of the substrate.

25 15. The method of claim 14 further comprising unloading the substrate from the tank without moving the first and second reflectors.

30 16. The method of claim 14 wherein reflecting the sonic energy toward an edge of the substrate includes reflecting the sonic energy toward the edge of the substrate so as to provide a 100% duty cycle.

17. The method of claim 14 further comprising focusing the reflected sonic energy at the edge of the substrate.

5 18. The method of claim 14 wherein reflecting the sonic energy toward an edge of the substrate includes reflecting the sonic energy at an angle that corresponds to an angle of an edge bevel of the substrate.